Mini Project Report –

Unit Converter App

L&T Technology Services

L&T Technology Services

Document History

Ver. Rel. No.	Release Date	Prepared. By	Reviewed By	To be approved By	Remarks/Revision Details
1	06/07/21	99004928	Team 21,22	Patrick Andrews	
2	06/07/21	99004929	Team 21,22	Patrick Andrews	
3	06/07/21	99004930	Team 21,22	Patrick Andrews	
4	06/07/21	99004928	Team 21,22	Patrick Andrews	
5	06/07/21	99004928	Team 21,22	Patrick Andrews	

Table of Contents

L&T Technology Services

Introduction

Our project is all about Unit Conversion. It specifies how the Conversion is being done in each module. We have created five different functionalities of our project. Those five functionality includes Area converter, length converter, digital converter, temperature converter and weight converter. In each sub module or the functionalities, we have included almost all the units for the conversion. This project also follows the SDLC technique to design, develop and test our project. Python language is used for the implementation of the code. The project is being pushed in the github repository and testing and workflows are also done for the project.

Product Built: NEED of Conversion Units

- We all know that purpose of making unit conversion is to convert one unit to another with equal amount which will only be possible if both are having the same units. Unit conversion is important when dealing with mathematical problems or numericals. Because when working with equations, you have to make sure you're working in a consistent set of units, or you won't get the correct answer.

- Converting units is not just important, it is crucial! Space probes have been lost because of miscommunication of units between scientists/engineers .

- Unit conversion is very important because the rest of the world other than three contries uses the metric system. So, converting units is important in science because it uses the metric system. The metric system are measurements like cm, m, l, mL, etc... The US version are measurements like ft, lbs, miles, etc...

  So, that's why we discussed to make "unit conversion" as our project as our project deals with all the basic unit conversions including weight, length, area, digital and temperature.

SW

UI can be improved with better design techniques

Can be modified to add currency conversion support

Can be modified to run using a web-based interface so everyone can remotely utilise this tool instead of installing it on their systems

Approximated units may not be fully
datatypes)

Numbers outside the range [-214748
calculated in certain machines and py

Will not run on machines without a di
functionality and cannot be run on se

Simple - This
Use less com
and faster to

Cross-platfor
(TKinter) whi
have a worki

UI can be imp
Can be modifi
Can be modifi
remotely utilis

OPPORTUNITIES

THREA

4W's and 1'H

Who

- The tool is a helping hand for young children who would like to counter verify their conversions and also for scientific researchers and mathematicians.

What

- A metric conversion calculator that does metric conversions in a few seconds.

When

- When people are struggling with simple conversions or when kids would like to cross verify their answers while practicing or when people need conversion results in a jiffy to proceed on further with their calculations.

Where

- Can be put to use where simple or advanced scientific and mathematical calculations requiring conversions are involved.

How

- The system opens up to the standard list of metric conversions that are available. Upon selection of one the standard system, the list of inter-conversions i.e., the sub-system is shown on the screen. The user can now choose one subunit that needs to be converted into one or more other subunits that are available on the list. The results for all these conversions are flashed in a second.

Requirements

Introduction

- Knowing the units of measurement that correspond with a number can give you so much more information than a digit as a standalone.
- In a nutshell, the unit of measurement in science and math serves as the supporting pillar upon which a number rests.
- Unit conversion is a process that involves multiplication or division by a numerical factor.
- With the global flow of information that occurs these days, it is very important for everyone to learn these most basic conversion factors.
- Keeping in mind all the conversion and interconversion processes may not be easy for everyone.

Research

- During the French Revolution, the then-existing measurement system was so impractical for trade and scientific purposes.
- So, it set the stage for the emergence of a system of measurement with rationally related units and simple rules for combining them.
- Thus, a decimal-based conversion system, called the Metric System, was introduced and it was widely accepted by scientists of those days for being a rational system.
- The metric system was devised with an aim "for all people, for all time."
- Today, the official system of measurement in most of the countries across the world is the metric system also known as the "International System of Units.
- Through a standard system, there are many units within the metric systems and inter-conversion is tedious because one has to remember all the conversion factors.
- Hence a tool that makes all these conversions immediately available will be a welcoming choice.

Cost and Features

- Proper unit conversion can allow for huge savings in most scenarios, particularly high precision is required.

L&T Technology Services

- This unit conversion software is free-of-cost and open-source.
- This software is also platform independent, and requires just a simple Python installation to work where it is required.
- The various features/options for interconversion of the system are:
  - o Data storage
  - o Length
  - o Area
  - o Volume
  - o Mass
  - o Speed
  - o Pressure
  - o Power etc.

System Requirements

- Processor : Modern Intel Celeron/Pentium equivalent (Dual-Core)
- RAM : 2GB (minimum)
- Storage : 10MB free space
- Operating System : Windows/Linux/MacOS
- Display Resolution : atleast 1024x768 resolution

Software Requirements

- Operating System : Windows/Linux/MacOS
- Python 3.6+

Detailed Requirements

High Level Requirements

ID	Description	Status
HR_01	Length	Implemented
HR_02	Area	Implemented
HR_03	Digital	Implemented
HR_04	Temperature	Implemented
HR_05	Weight	Implemented

Low Level Requirements

ID	Description	HLR_ID	Status
LR_01	Nautical Miles	HR_01	Implemented
LR_02	Miles	HR_01	Implemented
LR_03	Yards	HR_01	Implemented
LR_04	Feet	HR_01	Implemented
LR_05	Kilometers	HR_01	Implemented
LR_06	Meter	HR_01	Implemented
LR_07	Centimeter	HR_01	Implemented
LR_08	Millimeters	HR_01	Implemented
LR_09	Square Meter	HR_02	Implemented
LR_10	Square Km	HR_02	Implemented

LR_11	Square Root	HR_02	Implemented
LR_12	Square Cm	HR_02	Implemented
LR_13	Square Foot	HR_02	Implemented
LR_14	Square Inch	HR_02	Implemented
LR_15	Square Mile	HR_02	Implemented
LR_16	Square Millimeter	HR_02	Implemented
LR_17	Square rod	HR_02	Implemented
LR_18	Square Yard	HR_02	Implemented
LR_19	Square Township	HR_02	Implemented
LR_20	Square acre	HR_02	Implemented
LR_21	Square are	HR_02	Implemented
LR_22	Square barn	HR_02	Implemented
LR_23	Hectare	HR_02	Implemented
LR_24	Homestead	HR_02	Implemented
LR_25	Bit	HR_03	Implemented
LR_26	Byte	HR_03	Implemented
LR_27	Megabyte	HR_03	Implemented
LR_28	Kilobyte	HR_03	Implemented
LR_29	Gigabyte	HR_03	Implemented

LR_30	Terabyte	HR_03	Implemented
LR_28	Petabyte	HR_03	Implemented
LR_28	Celcius	HR_04	Implemented
LR_28	Faharenheit	HR_04	Implemented
LR_33	Kelvin	HR_04	Implemented
LR_34	Kilogram	HR_05	Implemented
LR_35	Hectagram	HR_05	Implemented
LR_36	Decagram	HR_05	Implemented
LR_37	gram	HR_05	Implemented
LR_38	Decigram	HR_05	Implemented
LR_39	Centigram	HR_05	Implemented
LR_40	Milligram	HR_05	Implemented

AGEING :

- The earliest known uniform systems of measurement seem to have all been created sometime in the 4th and 3rd millennia BC among the ancient peoples of Mesopotamia, Egypt and the Indus Valley, and perhaps also Elam in Persia as well.
- In the Magna Carta of 1215 (The Great Charter) with the seal of King John, put before him by the Barons of England, King John agreed in Clause 35 "There shall be one measure of wine throughout our whole realm, and one measure of ale and one measure of corn—namely, the London quart;—and one width of dyed and russet and hauberk cloths—namely, two ells below the selvage..."
- Convert Weight/Mass units, such as Microgram, Milligram, Kilogram, Pound, Ounce, Gram, etc.
- Convert Length/Distance units, such as Millimeter, Centimeter, Meter, Kilometer, Mile, Yard, etc.
- Convert Area units, such as Square Meter, Square Kilometer, Square Mile, Square Yard, Square Foot, Square Inch, etc.
- Convert Temperature units, such as Celsius, Fahrenheit, Kelvin.
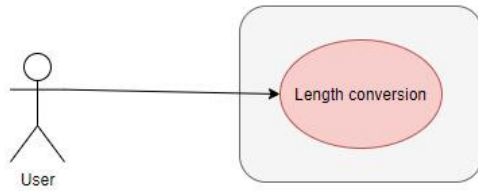
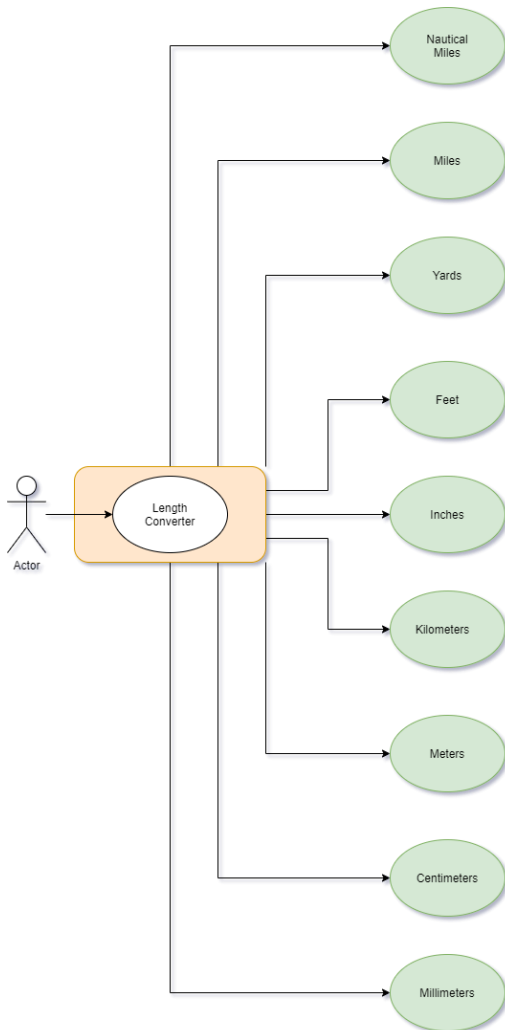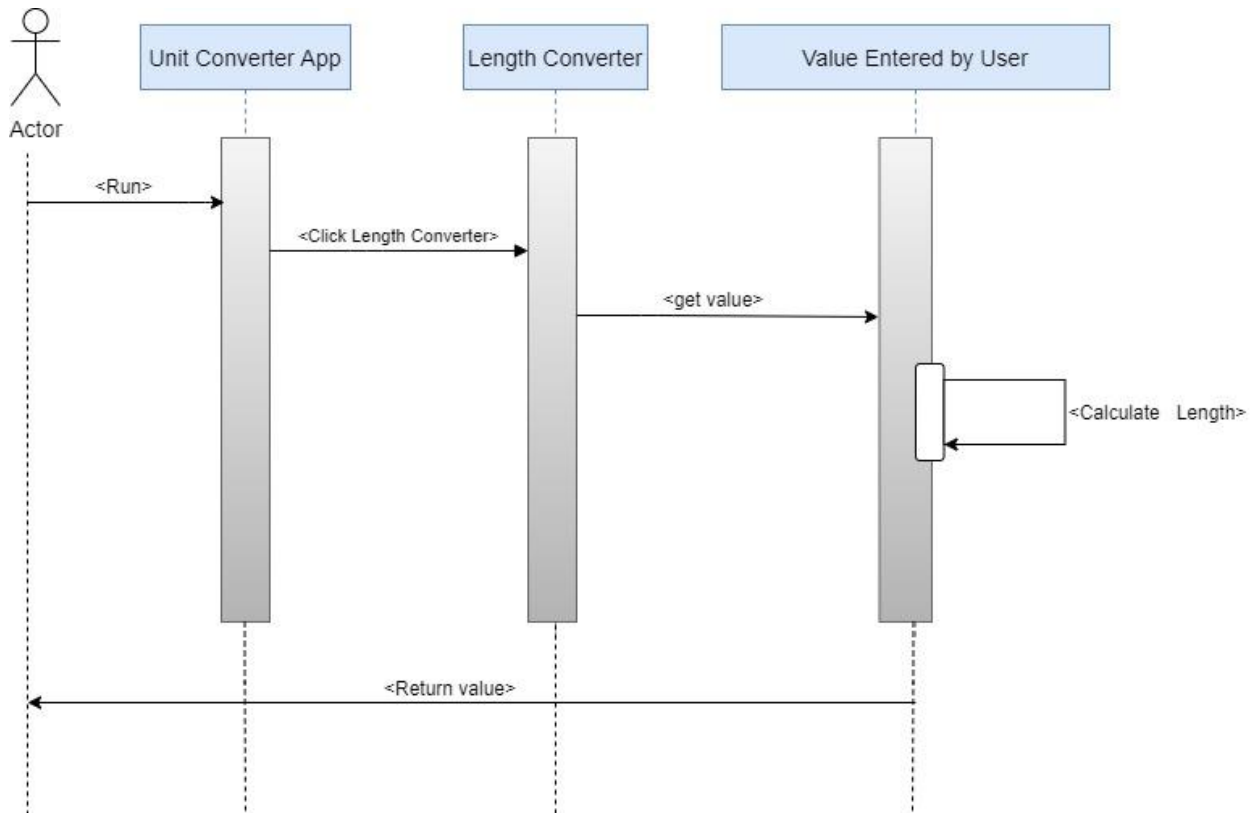## Architecture/Design
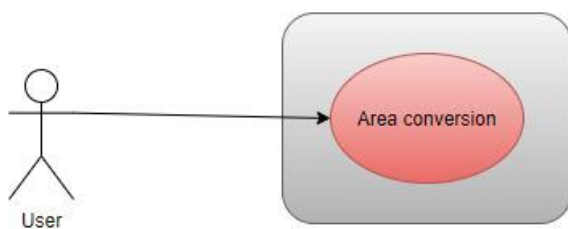
High Level Diagram
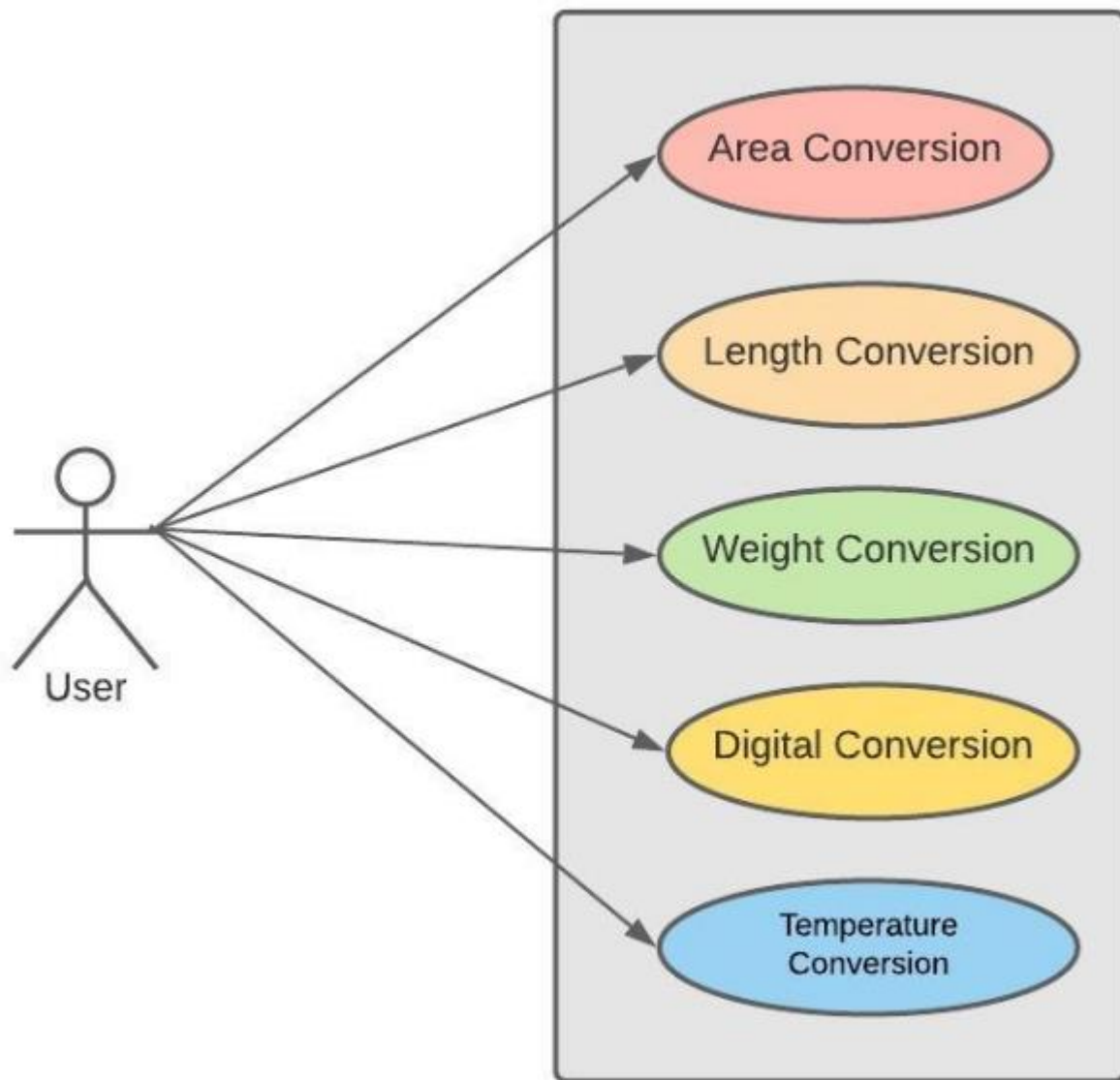
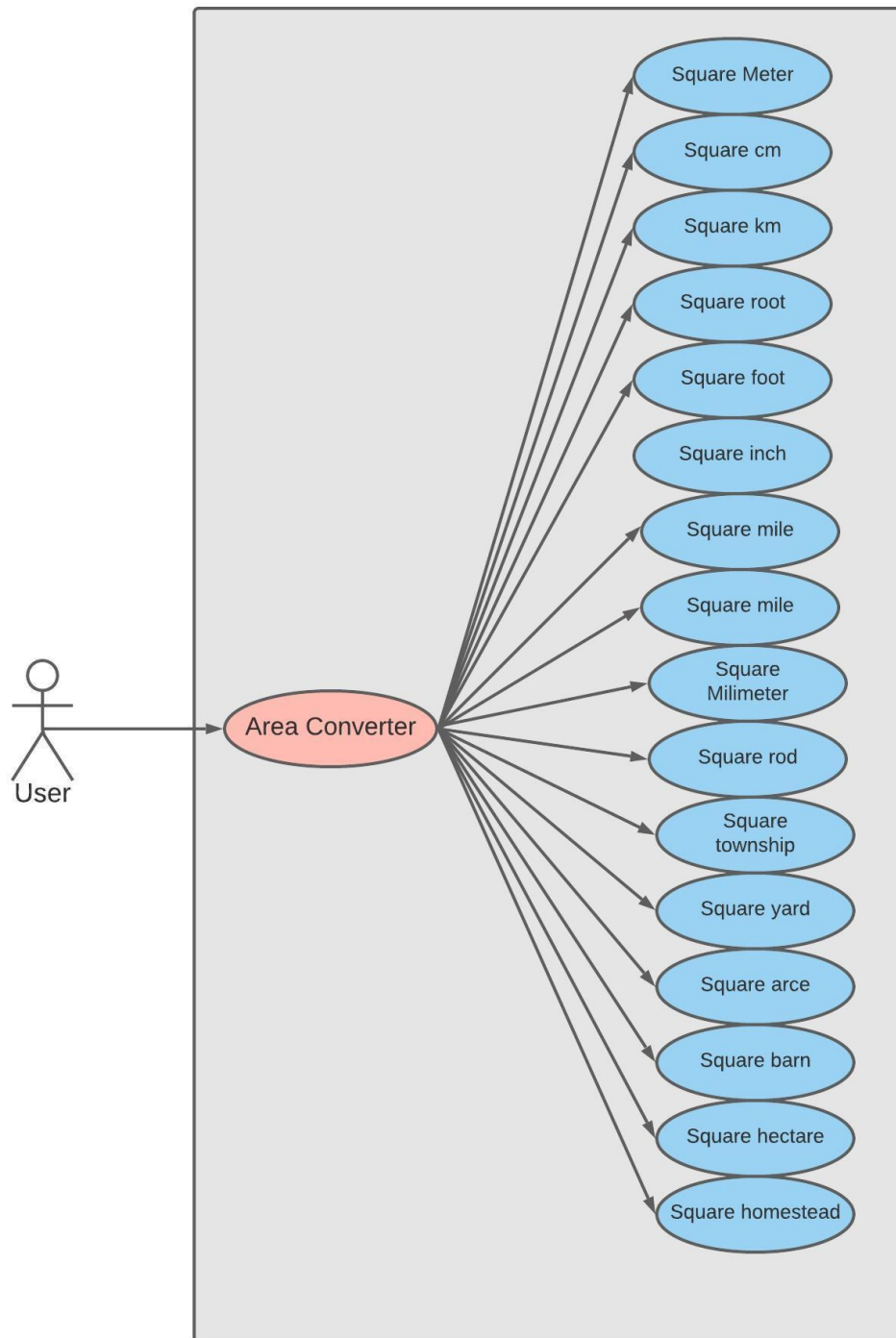Low Level Diagram

_____
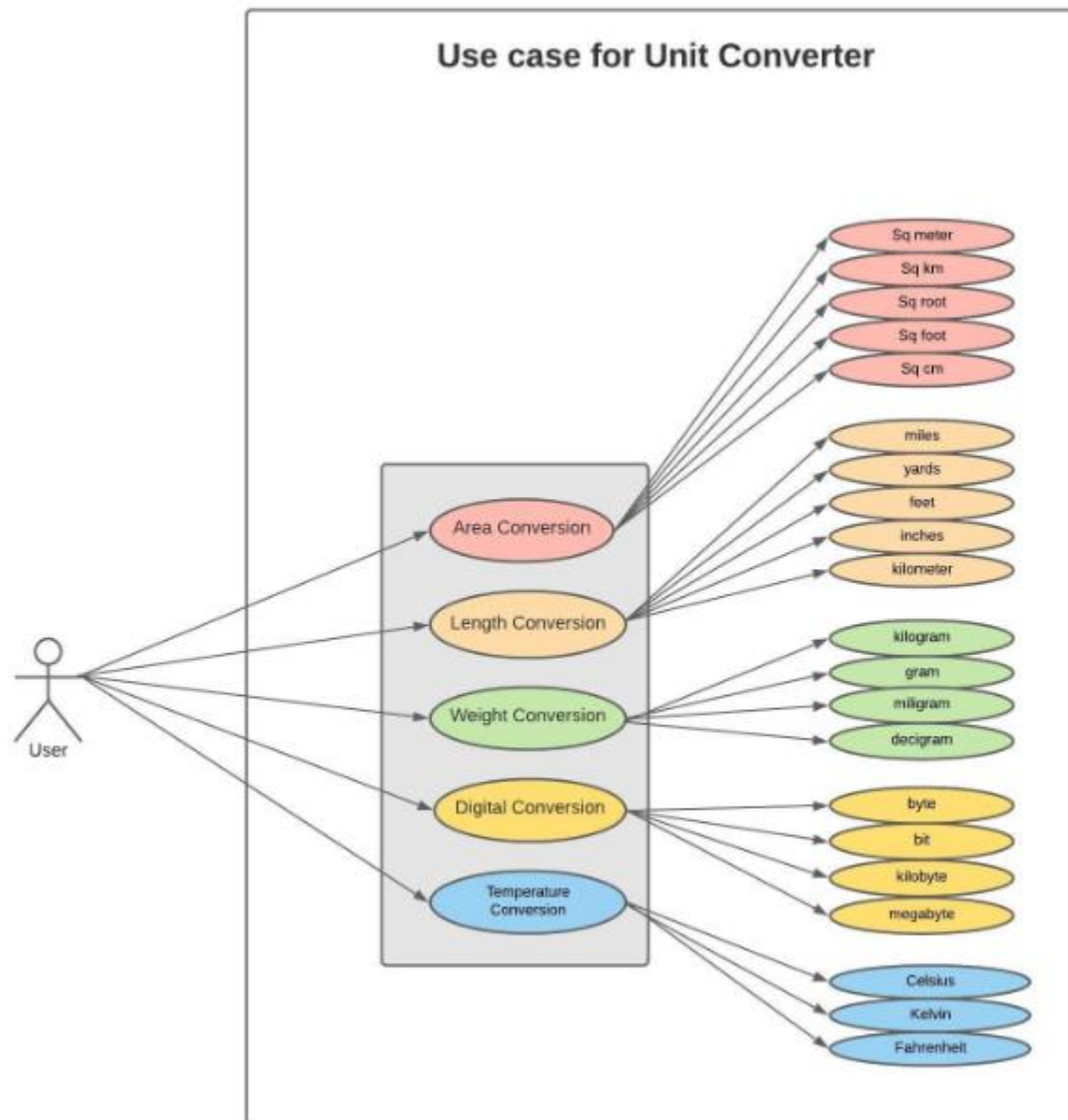
High Level Length
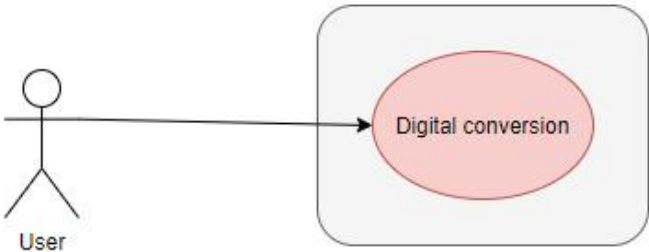

Low Level Length

_____

Sequence Length

Area High Level

L&T Technology Services

_____

Area Low Level

_____

L&T Technology Services

Area Sequence
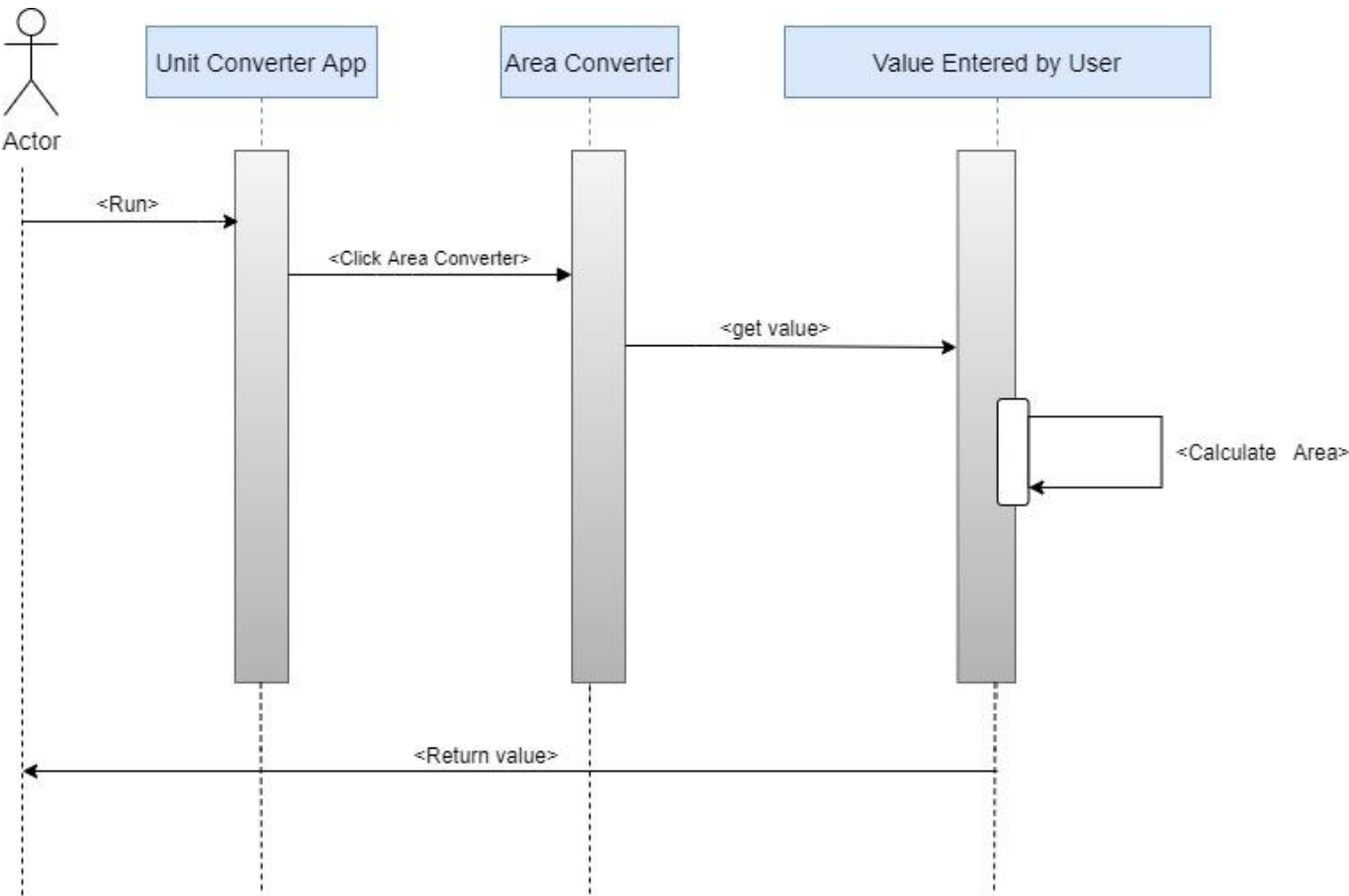
Digital High Level

_____

Digital Low Level

Digital Sequence

_____

Temperature High Level
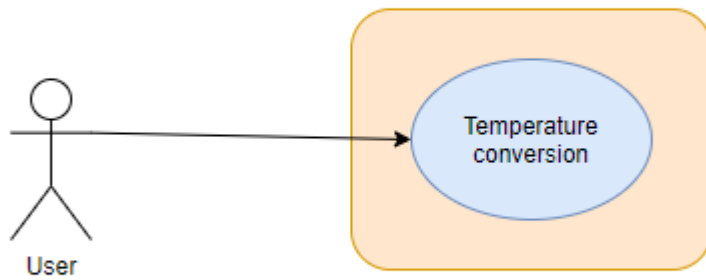
Temperature Low Level

L&T Technology Services

_____
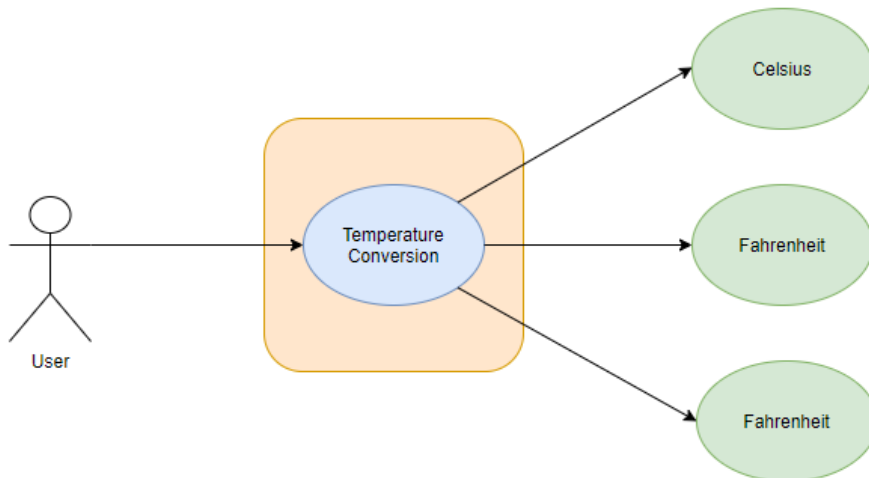
Temperature Sequence

Weight High Level

_____
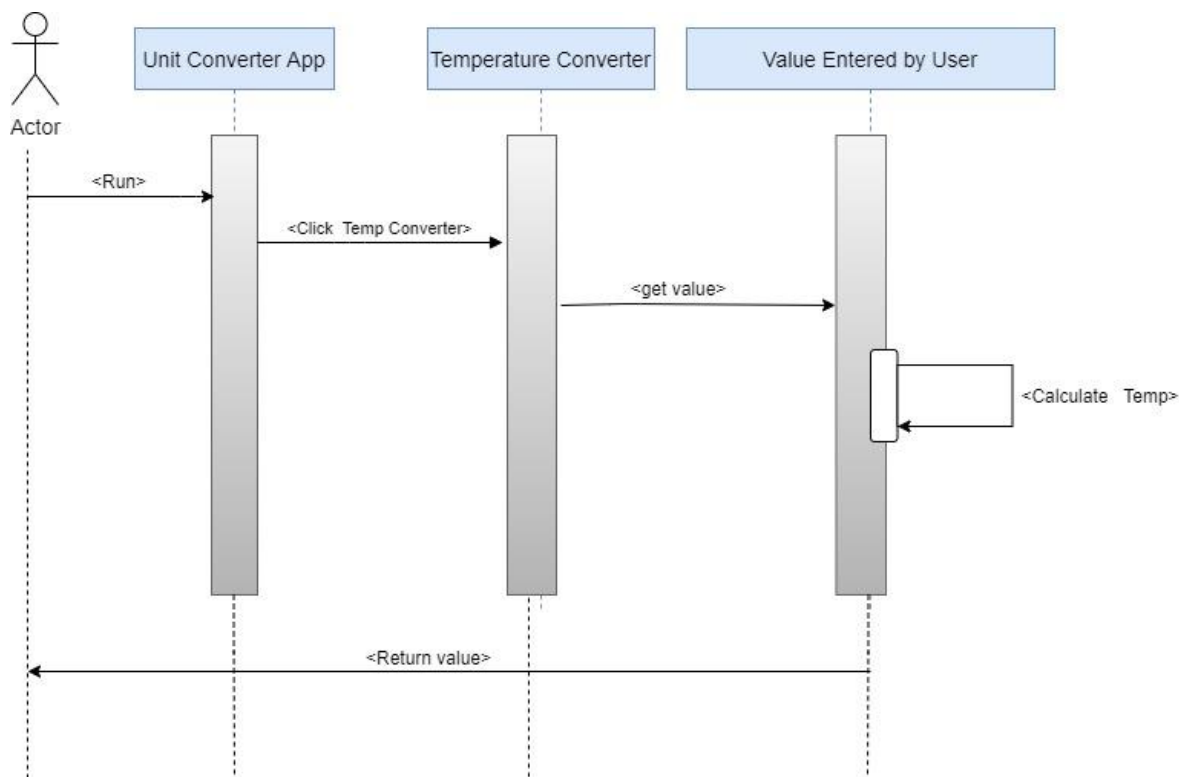
L&T Technology Services   **CONFIDENTIAL**
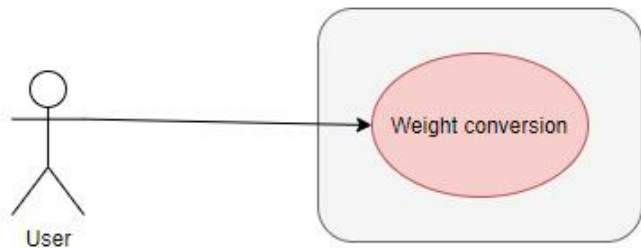
GENESIS Learning Report – Module Name

_____

Weight Low Level

Weight Sequence

_____

L&T Technology Services
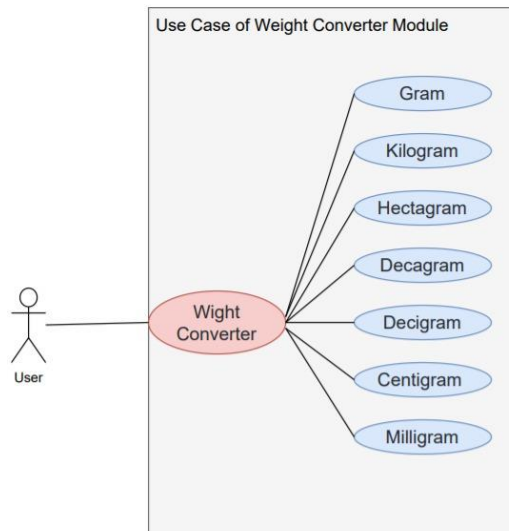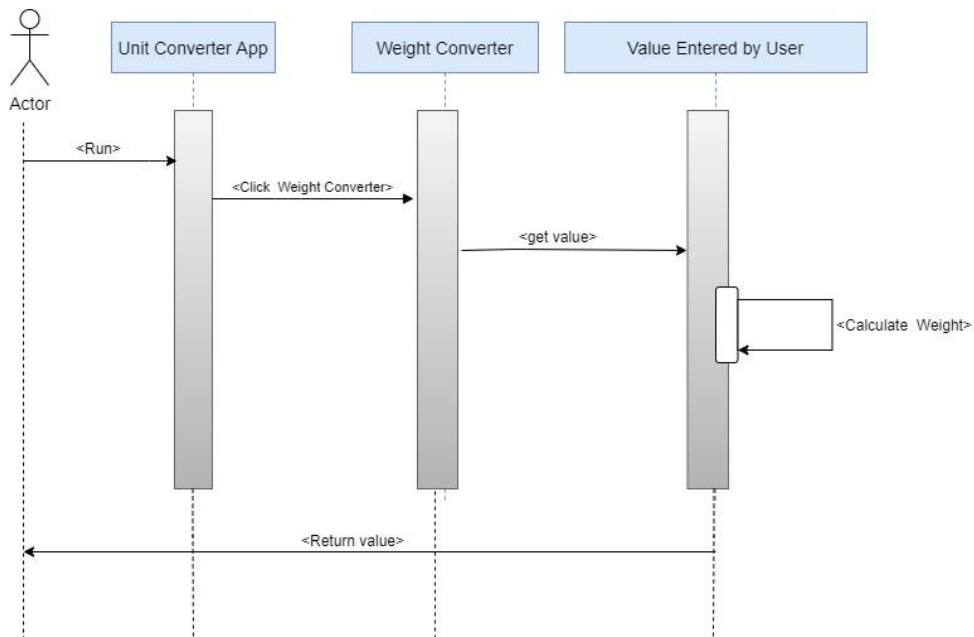
Test Plan

High Level Test Plan

Function	Based On	Test Function	Function Used	Input	Expected O/P	Real O/P	Status
Digital	Requirement	`test_convert_digital()`	`convert_digital.convert()`	`1,"kB","byte"`	1000	1000	✓
Weight	Requirement	`test_convert_weight()`	`convert_weight.convert()`	`1,"kg","g"`	1000	1000	✓
Length	Requirement	`test_convert_length()`	`convert_length.convert()`	`1000,"cm","m"`	10	10	✓
Area	Requirement	`test_convert_area()`	`convert_area.convert()`	`1,"sqm","sqcm"`	10000	10000	✓
Temperature	Requirement	`test_convert_temp()`	`convert_temp.convert_celTokel()`	38	281.5	281.5	✓
Temperature	Requirement	`test_convert_temp()`	`convert_temp.convert_celTofah()`	38	100.4	100.4	✓

Implementation Screenshots:-

Main Menu

L&T Technology Services
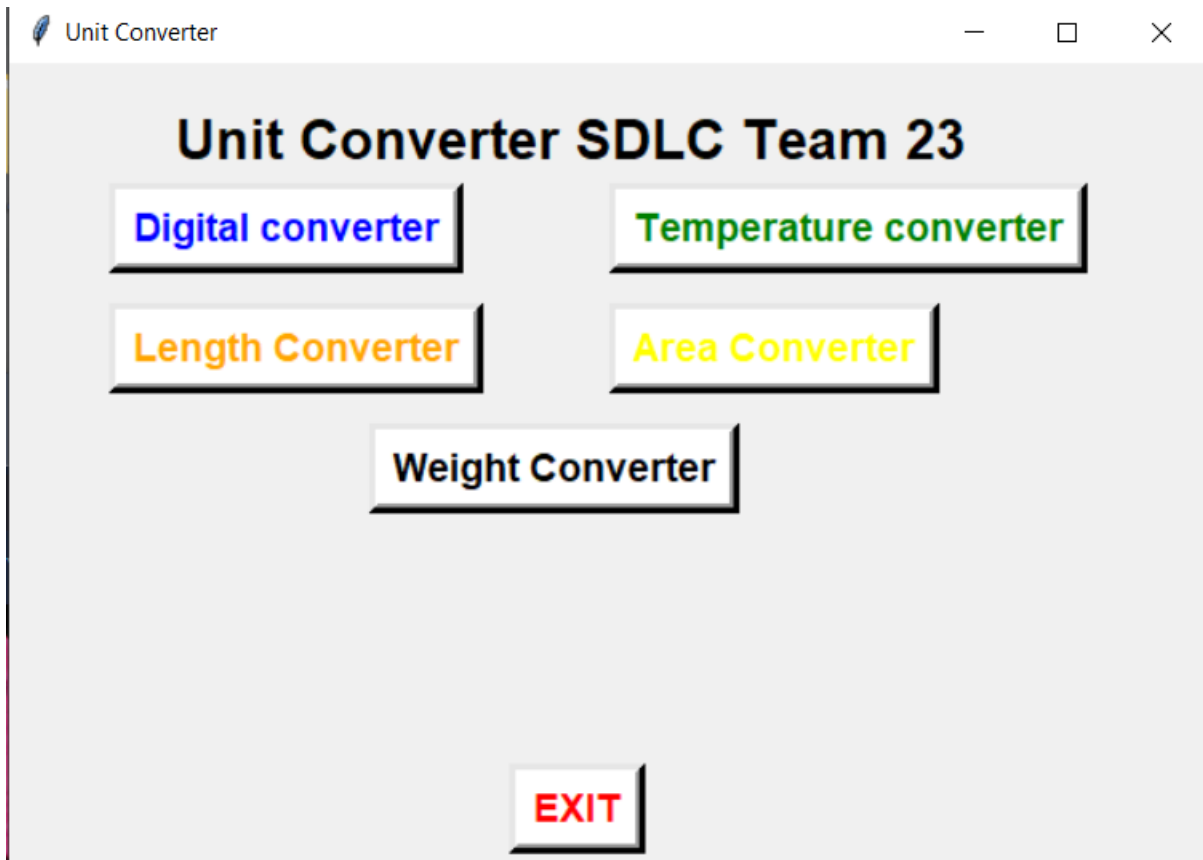
Sub-Modules :

Temperature :

Length :

L&T Technology Services

Digital :

Area :

L&T Technology Services

Weight :

L&T Technology Services
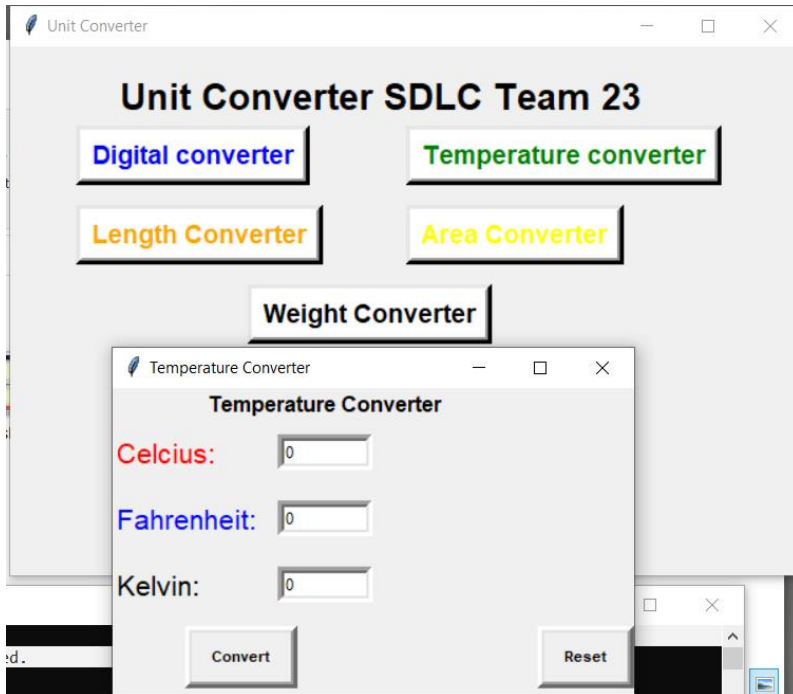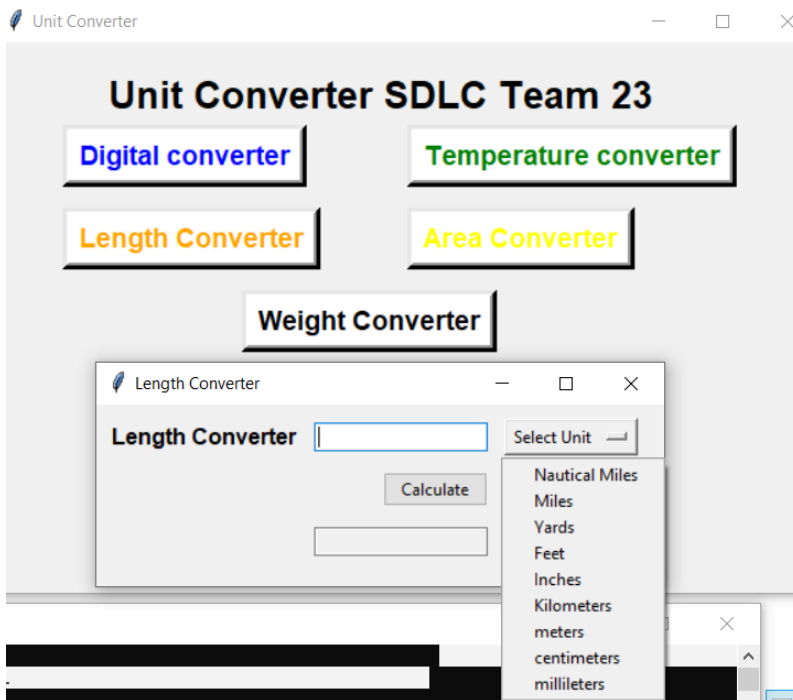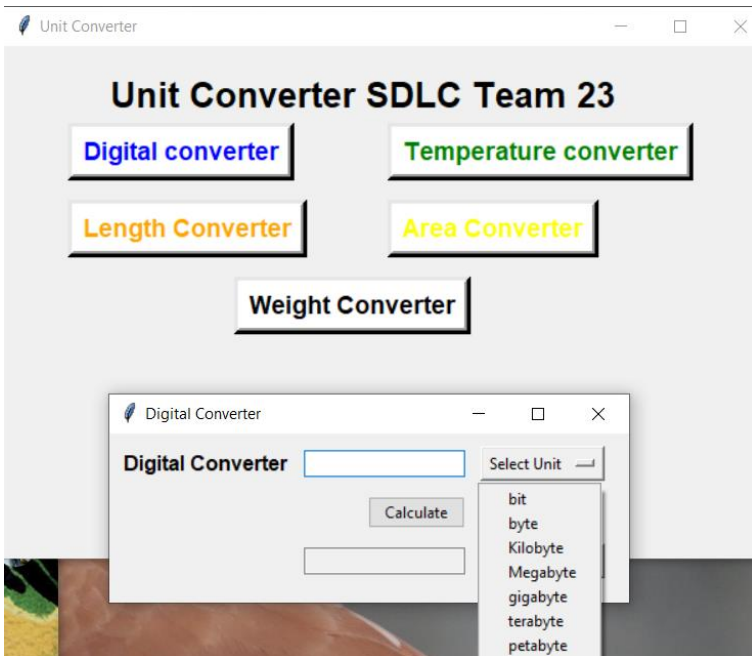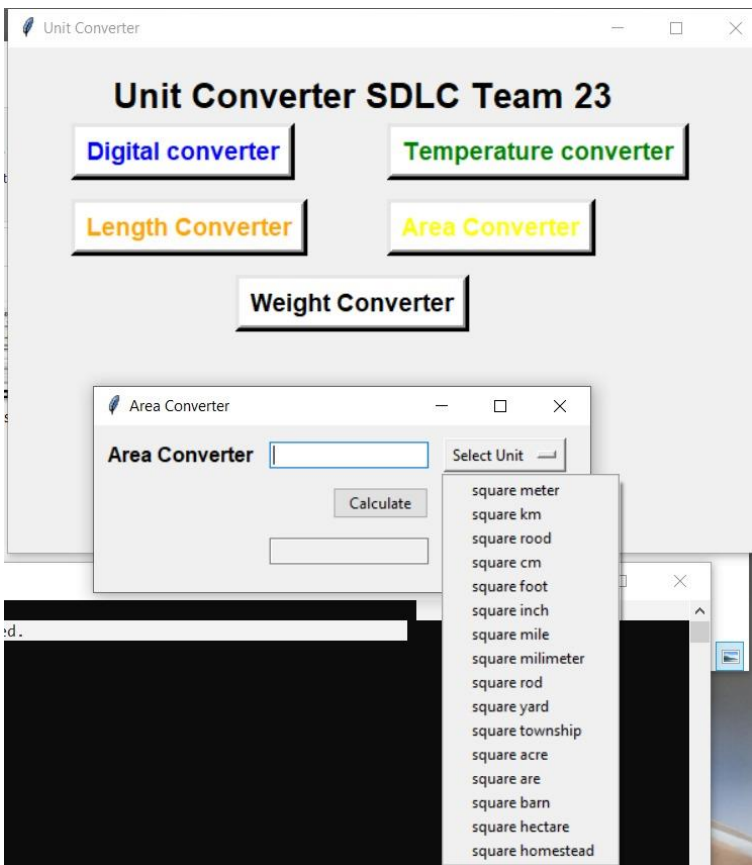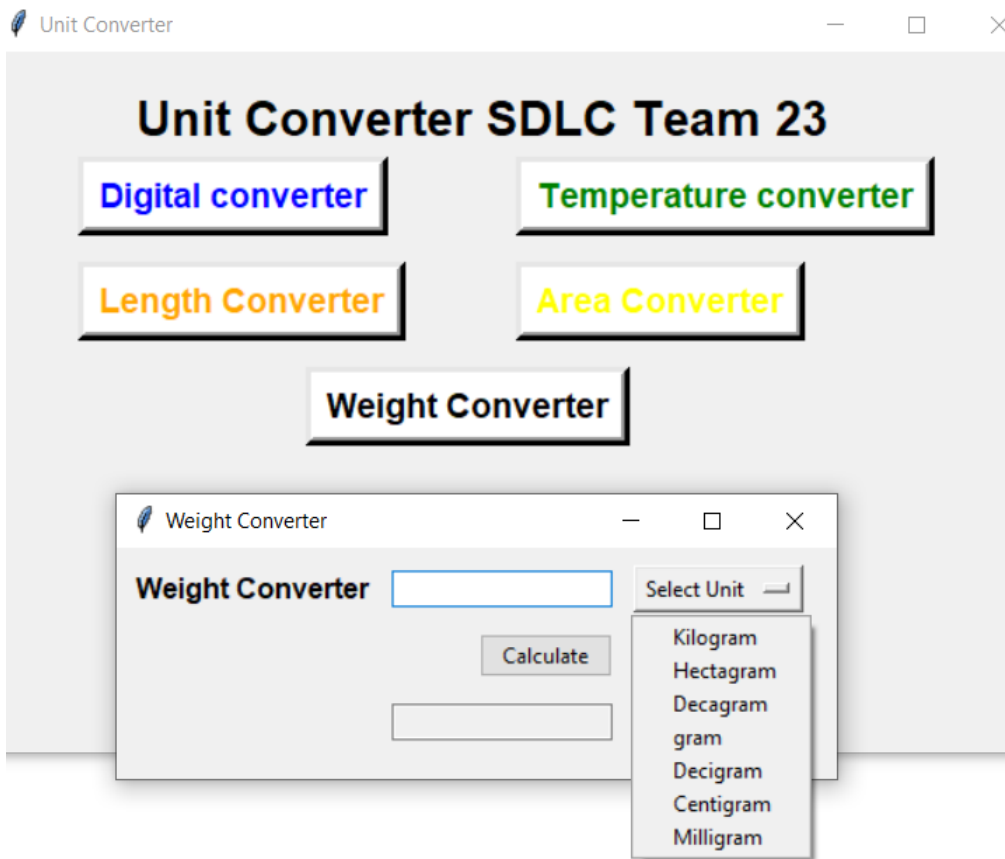
Code Coverage :

```
C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>pytest --cov=. --cov-report term 3_Implementation
=============================== test session starts ===============================
platform win32 -- Python 3.9.5, pytest-6.2.4, py-1.10.0, pluggy-0.13.1
rootdir: C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23
plugins: cov-2.12.1
collected 5 items

3_Implementation\test\test_pytest.py .....                                   [100%]

---------- coverage: platform win32, python 3.9.5-final-0 ----------
Name                                    Stmts   Miss  Cover
----------------------------------------------------------
3_Implementation\src\__init__.py            0      0   100%
3_Implementation\src\convert_area.py        6      2    67%
3_Implementation\src\convert_digital.py     6      1    83%
3_Implementation\src\convert_length.py      6      1    83%
3_Implementation\src\convert_temp.py       12      4    67%
3_Implementation\src\convert_weight.py      6      1    83%
3_Implementation\test\__init__.py           0      0   100%
3_Implementation\test\test_pytest.py       13      0   100%
----------------------------------------------------------
TOTAL                                      49      9    82%

=============================== 5 passed in 0.30s ===============================

C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>
```

Flake8 :

```
C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>flake8 . --count --select=E9,F63,F7,F82 --show-source --statistics
0

C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>
```

Unit Testing :

```
C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>pytest 3_Implementation
=============================== test session starts ===============================
platform win32 -- Python 3.9.5, pytest-6.2.4, py-1.10.0, pluggy-0.13.1
rootdir: C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23
plugins: cov-2.12.1
collected 5 items

3_Implementation\test\test_pytest.py .....                                   [100%]

=============================== 5 passed in 0.10s ===============================

C:\Users\Palaash\Desktop\codespace\sdlc-project\sdlc2-team-23>
```

L&T Technology Services   **CONFIDENTIAL**

L&T Technology Services

Activity 2

Agile Methodology:

Theme

Implementing features like length, weight, area, digital, temperature conversion.

Epic

Implementing a tool to convert a number from one unit to another.

User Story

- As a student I want to be able to implement unit conversion of a number at a point to help with my studies.
- As a college student I want to be able to implement unit conversion to solve daily life data as well as at a point to help with my college assignment.
- As a researcher I want to be able to implement unit conversion to work with equations at a point to help with my research.

- As a student I want to be able to implement convert method to find units of a number at a point to help with my understanding of this method.
- As a design enthusiast I want to see the time taken to run each sub module to compare their performance.

References
* Python Tutorial
* TKinter Tutorial
* GitHub Docs
* Article - How to Configure Github Actions the Easy Way
* Official Tkinter Documentation